IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	D. Stephen Lane, et al.	*Customer No.*	34444
Serial No.	10/533,994	*Art Unit:*	1751
Filing Date:	May 5, 2005	*Examiner:*	Brian P. Mruk

Title: Corrosion Protection for Metals in Cementitious Material and Method of Applying and Making the Same

AFFIDAVIT UNDER 37 CFR § 1.132

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I, S. Ray Taylor declare and state as follows.

1. I am the Director of the Houston Biomaterials Research Center and Professor of Restorative Dentistry and Biomaterials at the University of Texas Health Science Center at Houston.

2. I have a Ph.D. in Materials Science and Engineering from the University of Virginia, Charlottesville, Virginia, 1986.

3. A listing of my education, publications, projects, awards, and work history are provided in my Curriculum Vitae in the attached Appendix (see e-mail attachment).

4. I am familiar with the prosecution of the above-identified Application.

5. In response to the pending rejections of the claims in this case as follows:

a. The rejection of claims 1-59 under 35 U.S.C. 102(b) as anticipated by or, in he alternative, under 35 U.S.C. 103(a) as obvious over Bennett, WO 01/40547;

b. The rejection of claims 1-59 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bennett, US. Patent No. 6,033,553;

c. The rejection of claims 1-59 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Bennett, U.S. Patent No. 6,217,742;

d. The rejection of claims 1-59 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Stokes et al, U.S. Patent No. 6,022,408;

e. The rejection of claims 1-59 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Foltz et al, U.S. Patent No. 5,985,011,

I submit the following data:

6. The corrosion of steel reinforcement bars (rebar) embedded within concrete is a costly and limiting problem within the infrastructure. Corrosion of a metal is an electrochemical process, and an electrochemical reaction is distinctly different than a chemical process. In an electrochemical reaction, electrons are either a product or reactant in the reaction. In an oxidation reaction, electrons are a product. In a reduction process, electrons are a reactant. Corrosion requires both, an oxidation reaction and a reduction reaction to conserve charge. In the oxidation reaction, metal atoms become metal ions and electrons as the products of reaction ($M \rightarrow M^{n+} + ne^-$). These electrons are consumed by a reduction process, *e.g.*, the reduction of oxygen in the presence of water to produce hydroxyl ions. In both cases, electrons are either a product or reactant making the electrochemical reaction distinctly different than a chemical reaction. Chemical reactions do not predict electrochemical reactions, nor do electrochemical reactions predict chemical reactions.

7. Patents 5,985,011 (Stokes, Foltz, Manissero) and 6,022,408 (Foltz, Wang, Stokes, Manissero) use lithium nitrate (LN) as an agent to control the alkali silica reaction (ASR). ASR is a chemical reaction between silaceous rock (aggregate) and the alkaline environment created by cement. The chemical reaction between these two materials produces a gel-like reaction product on the surface of the aggregate that is of a higher volume than the original silaceous aggregate. This layer with expanded volume places the cement in tension and causes cracking of the concrete since concrete is weak in tension. LN is mixed into the cement paste to alter the physical properties of the gel reaction product, so that there is no volume change. The ASR is a chemical reaction between two ceramic phases and does not predict or teach us about the electrochemical reaction between the steel rebar and the cement.

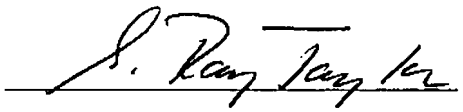
8. Using LaChatlier's Principal, one can shift the direction and tendency of a reaction by changing the amount of reactants or products. Looking at the anodic reaction, $M \rightarrow M^{n+} + ne^-$, one can cause the reaction to proceed in reverse, thereby reversing corrosion, by supplying electrons to this reaction. In patents 6,033,553 and 6,217,742 (Bennett),

electrons are supplied by an external power source, e.g., a battery or power generator, to suppress corrosion. Therefore, corrosion is suppressed by the external power source which could be a battery beneath the bridge or a solar panel, etc. To increase the efficiency of power transmission within the very electrically resistive concrete, a salt, LN, is added to the cement paste. LN increases the conductivity of the concrete by increasing the number of charge carriers through dissociation into its cationic (Li^+) and anionic (NO_3^-) species. LN also increases the conductivity by increasing the humidity at the bar interface thus providing more electrolyte in this critical region. In both cases, the chemical caused by LN would predict that LN should increase corrosion. The additional claim for lithium salts in patent 6,217,742 is that it will minimize the deleterious effect of the anode reaction product (hydroxyl) on grout or mortar, in other words, alkali-silica reaction. The Bennett patents teach us that LN would increase the corrosion rate of steel rebar. In summary, the Bennett patents achieve corrosion suppression through the application of external power and do not teach us that LN is a corrosion inhibitor.

9. The patent application by Lane, Chambers, and Taylor shows that LN itself is a corrosion inhibitor of steel rebar when it is mixed into the concrete paste. This effect on an electrochemical reaction is not taught by the ASR patents which discussed a chemical reaction between two ceramic materials. In addition, the Bennett patents teach us that LN should increase the corrosion of steel rebar, when in reality the Lane, Chambers, Taylor patent teach us that LN inhibits corrosion of the steel rebar.

10. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like so made punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code that such willful false statements may jeopardize the validity of the application of any patent issued thereon.

Date: August 15, 2007



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EDUCATION

Ph.D.	Materials Science and Engineering	University of Virginia, 1986
M.S.	Biomedical Engineering	Case Western Reserve University, 1980
B.S.	Engineering Science	University of Virginia, 1976

PROFESSIONAL EXPERIENCE

8/07 to Present	Director, Houston Biomaterials Research Center, Professor, Department of Restorative Dentistry and Biomaterials University of Texas Health Science Center at Houston - Dental Branch, Houston, Texas
12/03 to 7/07	Professor, Department of Biomedical Materials Science, School of Dentistry, University of Mississippi Medical Center, Jackson, Mississippi
1995 to 11/03	Research Associate Professor, Department of Materials Science, School of Engineering and Applied Science, University of Virginia
1999 to 7/03	Joint Appointment - Virginia Transportation Research Council
1987 to 1995	Research Assistant Professor, University of Virginia
1986 to 1987	Senior Scientist, University of Virginia
1980 to 1982	Senior Research Engineer, Applied Medical Technology, Inc., Cleveland, Ohio
1975 to 1977	Research Specialist, Department of Materials Science, School of Engineering and Applied Science, University of Virginia

PROFESSIONAL ACTIVITIES

Consultant Positions

Comdial, Inc., Charlottesville, VA
Dunham-Bush, Inc., Harrisonburg, VA
Sperry Corporation, Charlottesville, VA
AMP, Inc., Harrisburg, PA
BASF, Wyandotte, MI
Anheuser-Busch, Inc., St. Louis, MO
Va. Transp. Res. Council, Charlottesville, VA
Forensic Engr., International, Wash., DC
The Boeing Company, Seattle, WA
Nimbus Records, Inc., Charlottesville, VA
L. Raymond and Associates, Irvine, CA
British Oxygen, Murray Hill, NJ
Miles Corp., Middletown, VA
Master Builders Corp., Cleveland, Ohio
Bettis Atomic Power, West Mifflin, PA
UTRON, Inc., Manassas, VA
Hamilton Beach, Inc., Glen Allen, VA
Guidant Corporation, St. Paul, MN

Consultant Positions- continued

Henkels and McCoy, Inc., Richmond, VA
Medtronic, Inc., Fridley, MN
PPG, Inc., Allen Park, PA
Foster-Miller, Inc., Waltham, MA
The Solar Group, Taylorsville, MS
Boston Scientific, Inc. Maple Grove, MN

Editorial and Advisory Positions

2004 to Present Editorial Advisory Board – Anti-Corrosion Methods and Materials, Emerald Publishing Ltd.
9/06 to Present ASM Materials for Medical Devices Database – Committee Member

Professional Societies

The Electrochemical Society
National Association of Corrosion Engineers
American Society for Materials
Materials Research Society
Society for Biomaterials
American Dental Education Association

PUBLICATIONS AND REPORTS

Refereed Journal Articles

Biomaterials Research

1. S.R. Taylor and D.F. Gibbons, "The Effect of Surface Texture on the Soft Tissue Response to Polymer Implants", *J. Biomed. Matl. Res.*, **17**(2):205-228 (1983).
2. S.S. Park, D.H. Chi, A.S. Lee, , S.R. Taylor, and J.C. Iezzoni, "Biomechanical Properties of Tissue Engineered Cartilage from Human and Rabbit Chondrocytes", *Archives of Otolaryngology-Head and Neck Surgery*, **126**(1):52-57 (2002).
3. B.A. Kaplan, C.R. Gorman, A.K. Gupta, S.R. Taylor, J.C. Iezzoni, S.S. Park, "Effects of Transforming Growth Factor β and Insulin Growth Factor 1 on the Biomechanical and Histological Properties of Tissue-Engineered Cartilage", *Arch. Facial Plast. Surg.*, **5**:96-101 (2003).
4. H.-R. Jin, D.H. Chi, S.R. Taylor, S.S. Park, "Characteristics of Tissue-Engineered Cartilage from Human Chondrocytes", *The Laryngoscope*, (in press).

Coatings, Thin Films and Surface Modification

5. S.R. Taylor, G.L. Cahen, Jr., G.E. Stoner, M.W. Ferralli, P.J. Moran, "Ion Beam Assisted Deposition of Thin Carbonaceous Films - I. Seawater Immersion Performance", *J. Electrochem. Soc.*, **135**(4):809-817 (1988).
6. S.R. Taylor, G.L. Cahen, Jr., G.E. Stoner, "Ion Beam Assisted Deposition of Thin Carbonaceous Films - II. Adhesion Characteristics in Aqueous and Cathodically Delaminating Conditions", *J. Electrochem. Soc.*, **135**(12):2953-2952 (1988).
7. S.R. Taylor, G.L. Cahen, Jr., G.E. Stoner, "Ion Beam Assisted Deposition of Thin Carbonaceous Films - III. Barrier Properties", *J. Electrochem. Soc.*, **136**(4):929-935 (1989).
8. S.R. Taylor, "Assessing the Moisture Barrier Properties of Polymeric Coatings Using Electrical and Electrochemical Methods", *IEEE Trans. Electrical Insulation*,

24(5):787-806 (1989) (invited paper).

9. S.R. Taylor, C.M. Doyle, D.A. Johnson, and G.D. Brabson, Jr., "The Corrosion Behavior of Bimetallic Couples of Cu, Cr, and Ni in Polyamic Acid under Imidizing Conditions", *J. Electrochem. Soc.*, **140**(1):74-80 (1993).
10. J.A. Grandle and S.R. Taylor, "Electrochemical Impedance Spectroscopy as a Method to Evaluate Coated Aluminum Beverage Containers: I. Determination of an Optimal EIS Parameter for Large Sample Evaluation", *Corrosion*, **50**(10):792-803 (1994).
11. J.A. Grandle and S.R. Taylor, "Electrochemical Impedance Spectroscopy (EIS) as a Method to Evaluate Coated Aluminum Beverage Containers: II. Statistical Analysis of Performance", *Corrosion*, 53(5): 347-355 (1997).
12. M.W. Wittmann, R.B. Leggat, and S.R. Taylor, "The Detection and Mapping of Defects in Organic Coatings Using Local Electrochemical Impedance Methods", *J. Electrochem. Soc.*, **146**(11):4071-4075 (1999).
13. J.H. Osborne, K.Y. Blohowiak, S.R. Taylor, C.N. Hunter, G. Bierwagon, B. Carlson, D. Bernard, and M.E. Donley, "Testing and Evaluation of Nonchromated coating systems for aerospace", *Progress in Organic Coatings*, **41**(4):217-225 (2001).
14. A.M. Mierisch, J. Yuan, R.G. Kelly, and S.R. Taylor, "Understanding the Role of Coating and Substrate Heterogeneities in the Performance of Organic Coatings on AA2024-T3", *J. Electrochem. Soc.*, **146**(12):4449-4454 (1999).
15. R.B. Leggat and S.R. Taylor, "The Effect of Micron Scale Surface Deformation on the Corrosion Behavior of Coated AA5182", *Corrosion,* **55**(10):984 (1999).
16. C.N. Hunter, J.H. Osborne, and S.R. Taylor, "A New Electrochemical Test Procedure to Quantitatively Screen the Corrosion Performance of Aerospace Coatings", *Corrosion*, **56**(10):1059-1070 (2000).
17. A.M. Mierisch and S.R. Taylor, "Characterization of the Electrochemical Events at Intrinsic Breakdown Sites on Organically Coated AA2024-T3", *J. of Corr Sci. and Engr.*, **Vol. 2**, Paper 30, http://www.cp.umist.ac.uk/JCSE.
18. S.R. Taylor, " Incentives for Using Local Electrochemical Impedance Methods in the Investigation of Organic Coatings", *Progress in Organic Coatings*, **43**:141-148 (2001).
19. R.B. Leggat , S.R. Taylor, W. Zhang, and R.G. Buchheit, "Corrosion Performance of Field-Applied Chromate Conversion Coatings", *Corrosion,* **58**(3):283-291 (2002).
20. R.B. Leggat, W. Zhang, R.G. Buchheit, and S.R. Taylor, "Performance of Hydrotalcite Conversion Treatments on AA2024-T3 When Used Within a Coating System", *Corrosion*, **58**(4):322-328 (2002).
21. R.B. Leggat, S.A. Taylor, and S.R. Taylor, "Adhesion of Epoxy to Hydrotalcite Conversion Coatings: I. Correlation with Wettability and Electrokinetic Measurements", *Colloids and Surfaces A, Physiochemical and Engineering Aspects*, **210**:69-81 (2002).
22. R.B. Leggat, S.A. Taylor and S.R. Taylor, "Adhesion of Epoxy to Hydrotalcite Conversion Coatings: II. Surface Modification with Ionic Surfactants", *Colloids and Surfaces A, Physiochemical and Engineering Aspects*, **210**:83-94 (2002).
23. A.M. Mierisch and S.R. Taylor, "Understanding the Degradation of Organic Coatings Using Local Electrochemical Impedance Methods: I. Commonly Observed Features",

J. Electrochem. Soc., **150**(7):B303-B308 (2003).

24. A.M. Mierisch and S.R. Taylor, "Understanding the Degradation of Organic Coatings Using Local Electrochemical Impedance Methods: II. Modeling and Experimental Results of Normal Field Variations above Disk Electrodes", *J. Electrochem. Soc.*, **150**(7):B309-B315 (2003).
25. A.M. Mierisch and S.R. Taylor, "Understanding the Degradation of Organic Coatings Using Local Electrochemical Impedance Methods: III. Numerical Model of the Effect of a Dielectric Layer on the Electric Field Distribution above a Disk Electrode", *J. Electrochem. Soc.*, (in preparation).
26. A.M. Mierisch and S.R. Taylor, "Understanding the Degradation of Organic Coatings Using Local Electrochemical Impedance Methods: IV. An Experimental Examination of the Effect of a Dielectric Layer on the Electric Field Distribution above a Disk Electrode", *J. Electrochem. Soc.*, (in preparation).
27. P. Moongkhamklang and S.R. Taylor, "The Delineation of Ionic Pathways Through Organic Coatings Using a Molecular Probe", *Progress in Organic Coatings*, **46**(4):259-265 (2003).
28. S.R. Taylor and K. Sieradzki, "The Development of a Multi-Functional Aerospace Coating: Considerations in the Use of Nano-Dimensioned Materials", *Progress in Organic Coatings*, **47**(3-4):169-173 (2003).
29. S.R. Taylor, "The Delineation of Ionic Pathways in Organic Coatings Using Molecular Probes", *J. Corr. Sci. and Engr.*, (in review).
30. S.R. Taylor and P. Moongkhamklang, "The Delineation of Local Water Interaction with Epoxy Coatings Using Fluorescence Microscopy", *Progress in Organic Coatings*, (in press).
31. F. Contu, S.R. Taylor, L. Fenzy, "An FT-IR Investigation of Epoxy Coating Interactions with Simulated Corrosion Blister Electrolytes", *Progress in Organic Coatings*, (accepted).
32. S.R. Taylor, S. Raman, F. Contu, P. Moongkhamklang, "The Use of Cationic Fluoroprobes to Characterize Ionic Pathways in Organic Coatings", *Progress in Organic Coatings*, (accepted).
33. S.R. Taylor, G.J. Shiflet. J.R. Scully, R.G. Buchheit, W.J. vanOoij, C.J. Brinker, K.S. Sieradzki, R.E., Diaz, and A.L. Moran, "Increasing the Functionality of Military Coatings Using Nano-dimensioned Materials", *Corrosion Review* (in review).

Composites

34. R.C. Glass, S.R. Taylor, G.L. Cahen, Jr., G.E. Stoner, "Electrochemical Impedance Spectroscopy as a Method to Nondestructively Monitor Simulated In-Service Damage in a Carbon Fiber Reinforced Plastic", *J. Nondestructive Eval.*, **6**(4):181-188 (1987).
35. G.R.T. Schueller, S.R. Taylor, E.E. Hajcsar, "Evaluation of Natural Oxides on Aluminum in Neutral Borate Electrolyte", *J. Electrochem. Soc.*, **139**(10):2799-2805 (1992).
36. G.R.T. Schueller and S.R. Taylor, "The Nondestructive Evaluation of Adhesively Bonded Aluminum Using Electrochemical Impedance Spectroscopy. I. Theory and Experimental Investigation of Extrinsic Variables", *J. Electrochem. Soc.*, **139**(11):3120-3129 (1992).
37. G.R.T. Schueller and S.R. Taylor, "The Nondestructive Evaluation of Adhesively Bonded

Aluminum Using Electrochemical Impedance Spectroscopy. II. Experimental Investigation of Intrinsic Variables", *J. Electrochem. Soc.*, **140**(1):66-74 (1993).

38. S.R. Taylor, C.M. Doyle, D.A. Johnson, and G.D. Brabson, Jr., "The Corrosion Behavior of Bimetallic Couples of Cu, Cr, and Ni in Polyamic Acid under Imidizing Conditions", *J. Electrochem. Soc.*, **140**(1):74-80 (1993).
39. S.R. Taylor, "A Nondestructive Electrochemical Method to Detect and Quantify Graphite Fiber/Polymer Matrix Disbondment in Aqueous and Cathodically Polarized Conditions", *Composite Interfaces*, **2**(6):403-417 (1994).
40. S.R. Taylor, F.D. Wall, and G.L. Cahen, Jr., "The Detection and Analysis of Electrochemical Damage in Bismaleimide/Graphite Fiber Composites", *J.Electrochem. Soc.*, **143**(2):449-458 (1996).

Corrosion Inhibitors

41. D.G. Kolman and S.R. Taylor, "The Characterization of Sodium Molybdate as a Corrosion Inhibitor of Mild Steel in Natural Waters by Electrochemical Impedance Spectroscopy, Part I. Flow Rate Effects", *Corrosion*, **49**(8):622-634 (1993).
42. D.G. Kolman and S.R. Taylor, "The Characterization of Sodium Molybdate as a Corrosion Inhibitor Of Mild Steel in Natural Waters by Electrochemical Impedance Spectroscopy, Part II. Molybdate Concentration Effects", *Corrosion*, **49**(8):635-644 (1993).
43. R.L. Cook, Jr. and S.R. Taylor, "Pigment-Derived Inhibitors for Aluminum Alloy 2024-T3", *Corrosion*, **56**(3):321-333 (2000).
44. B.D. Chambers, S.R. Taylor, and M.W. Kendig, "The Rapid Discovery of Corrosion Inhibitors and Synergistic Combinations Using High Throughput Screening Methods", *Corrosion*, **61**(5):480-489 (2005).
45. S.R. Taylor and B.D. Chambers, "The Discovery of Non-Chromate Corrosion Inhibitors for Aerospace Alloys Using High-Throughput Screening Methods", *Corrosion Review* (in review).
46. B.D. Chambers and S.R. Taylor, "The High Throughput Assessment of Inhibitor Synergies on AA2024-T3 through Measurement of Surface Copper Enrichment", *Corrosion*, **63**(3):268-276 (2007).
47. B.D. Chambers, S.R. Taylor, "The High Throughput Assessment of Aluminum Alloy Corrosion Using Fluorometric Methods, Part I: Development of a Fluorometric Method to Assess Aluminum Concentration", *Corrosion Science*, **49**(3):1584-1596 (2007).
48. B.D. Chambers, S.R. Taylor, "The High Throughput Assessment of Aluminum Alloy Corrosion Using Fluorometric Methods, Part II: Rapid Evaluation of Corrosion Inhibitors and Synergistic Combinations", *Corrosion Science*, **49**(3):1597-1609 (2007).
49. B.D. Chambers and S.R. Taylor, "Multiple Electrode Methods to Massively Parallel Test Corrosion Inhibitors for AA2024-T3", NACE 2006 - San Diego, CA, Paper No.06678, National Association of Corrosion Engineers, Houston, TX (2006).
50. S.R. Taylor, B.D. Chambers, and F. Contu, "The Identification and Characterization of Non-chromate Corrosion Inhibitor Synergies Using High Throughput Methods",

Corrosion, (in preparation).

51. S.R Taylor and B.D. Chambers, "The Discovery of Non-Chromate Corrosion Inhibitors for Aerospace Alloys Using High-Throughput Screening Methods", *Benelux Métallurgie*, **45**(1-4):418-424 (2007).

Electrochemical Impedance Spectroscopy

52. S.R. Taylor and E. Gileadi, "The Physical Interpretation of the Warburg Impedance", *Corrosion*, **51**(9):664-671 (1995).

Infrastructure Materials

53. D.G. Enos and S.R. Taylor, "The Influence of Sulfate Reducing Bacteria on Alloy 625 and Austenitic Stainless Steel Weldments", *Corrosion*, **52**(11):831-842 (1996).
54. P.A. Cella and S.R. Taylor, "Resistance Changes as an Alternate Method to Monitor Corrosion of Steel in Concrete and Mortar", *Corrosion*, **56**(9):951-959, (2000).

Other Refereed Papers

55. S.A. White, G.E. Stoner, S.R. Taylor, "Electrochemical Sensors to Monitor the Corrosion of Reinforcing Steel in Concrete", Corrosion '89 paper no. 124, National Association of Corrosion Engineers, New Orleans (1989).
56. G.R.T. Schueller and S.R. Taylor, "Equivalent Circuit Modeling of Aluminum/ Polymer Laminates Using Electrochemical Impedance Spectroscopy", in ASTM STP1188, Electrochemical Impedance: Analysis and Interpretation, ed. by J.R. Scully, D.C. Silverman and M.W. Kendig, ASTM, Philadelphia (1993), pp. 328-343.
57. K.C. Stewart, D.G. Kolman and S.R. Taylor, "The Effect of Parasitic Conduction Pathways on EIS Measurements in Low Conductivity Media", in ASTM STP 1188, Electrochemical Impedance: Analysis and Interpretation, ed. by J.R. Scully, D.C. Silverman and M.W. Kendig, ASTM, Philadelphia, pp.73-93 (1993).
58. F.D. Wall, S.R. Taylor, and G.L. Cahen, Jr., "The Simulation and Detection of Electrochemically Derived Damage in Bismaleimide/Graphite Fiber Composites", in ASTM STP 1174, High Temperature and Environmental Effects on Polymeric Composites, edited by C.E. Harris and T.S. Gates, ASTM, Philadelphia, PA, pp.95-113 (1993).
59. D.G. Enos and S.R. Taylor, "The Influence of Sulfate Reducing Bacteria on Weldments of Alloy 625 Clad Pipe", Corrosion '93 paper no. 291, National Association of Corrosion Engineers, New Orleans (1993).
60. S.R. Taylor and G.L. Cahen, Jr., "The Detection and Analysis of Galvanic Damage in BMI/Graphite Fiber Composites", in Proceedings of the NATO Advisory Group for Aerospace Research and Development, **AGARD CP-565**: 6-1 to 6-12, AGARD NATO-OTAN, 6/1-6/12, Neuilly-Sur-Seine, France (1994) (invited paper).
61. T.A. Petersen and S.R. Taylor, "The Effects of Sulfate Reducing Bacteria on Stainless Steel and Ni-Cr-Mo Alloy Weldments", Paper No. 203, NACE, Houston, TX (1995).
62. T.A. Petersen and S.R. Taylor, "The Effects of Sulfate Reducing Bacteria on Stainless Steel and Ni-Cr-Mo Alloy Weldments", in Proceedings of the International Conference on Microbiologically Influenced Corrosion, NACE, Houston, TX, pp.56/1-56/20 (1995).

63. S.R. Taylor and M.W. Wittmann, "The Detection and Mapping of Defects in Organic Coatings Using Local Electrochemical Impedance Methods", in Electrically Based Microstructural Characterization, Vol. 411, edited by R.A. Gerhardt, S.R. Taylor, and E.J. Garboczi, Materials Research Society, Pittsburgh, PA, pp.31-38 (1996).
64. A.M. Mierisch and S.R. Taylor, "Understanding Coating and Substrate Heterogeneities Using Local Electrochemical Methods", in Electrically Based Microstructural Characterization II, Vol. 500, edited by R.A. Gerhardt, S.R. Taylor, and M. Alim, Materials Research Society, Pittsburgh, PA, pp. 35-42 (1998).
65. R.G. Buchheit, M.A. Martinez, L.P. Montes, N.P. Cella, S.R. Taylor, and G.E. Stoner, "Non-electrolytic Formation of Al-Oxide Surface Layers by Reversion of Hydrotalcite", Corrosion Paper No. 216, NACE, Houston, TX (1998).
66. R.G. Buchheit, M.A. Martinez, L.P. Montes, N.P. Cella, G.E. Stoner, and S.R. Taylor "Inorganic Cr-Free Conversion Coatings for High Corrosion Resistant and Low Electrical Contact Resistance", Corrosion Paper No. 212, NACE, Houston, TX 1998).
67. S.R. Taylor and A.M. Mierisch, "Incentives for Using LEIM in the Investigation of Corrosion Initiation on Organic Coated Alloys", in Electrically Based Microstructural Characterization III, Vol. 699, edited by R.A. Gerhardt, A.P. Washabaugh, M.A. Alim, and G.M. Choi, Materials Research Society, Pittsburgh, PA, pp. 137-150 (2002).

Articles and Chapters in Books

68. S.R. Taylor, "Coatings for Corrosion Protection: An Overview", Encyclopedia of Materials: Science and Technology, Ed. by K.H.J. Buschow, R.W. Cahn, M.C. Fleming, B. Ilschner, E.J. Kramer, and S. Mahajan, Pergamon, London, (2002) (3500 words).
69. S.R. Taylor, "Coatings for Corrosion Protection: Non-Metallic", Encyclopedia of Materials: Science and Technology, Ed. by K.H.J. Buschow, R.W. Cahn, M.C. Fleming, B. Ilschner, E.J. Kramer, and S. Mahajan, Pergamon, London, (2002) (3500 words).
70. S.R. Taylor, "Coatings for Corrosion Protection: Metallic", Encyclopedia of Materials: Science and Technology, Ed. by K.H.J. Buschow, R.W. Cahn, M.C. Fleming, B. Ilschner, E.J. Kramer, and S. Mahajan, Pergamon, London, (2002) (3500 words).
71. S.R. Taylor, "Coatings for Corrosion Protection: Organic", Encyclopedia of Materials: Science and Technology, Ed. by K.H.J. Buschow, R.W. Cahn, M.C. Fleming, B. Ilschner, E.J. Kramer, and S. Mahajan, Pergamon, London, (2002) (3500 words).
72. S.R. Taylor, "The Role of Intrinsic Defects in the Protective Behavior of Organic Coatings", Handbook of Environmental Degradation of Materials, Ed. By M. Kutz, William Andrews Publishing, NY, (2005).

Unrefereed Papers - Conference Proceedings

1. S.R. Taylor, G.L. Cahen, Jr., G.E. Stoner, P.J. Moran, M.W. Ferralli, "Ionized Monomer Implantation into Aluminum - A Seawater Immersion Study", in Fundamental Aspects of Corrosion Protection by Surface Modifications, Vol. 84-3, edited by E. McCafferty, C.R. Clayton, and J. Oudar, The Electrochemical Society, Pennington, NJ, pp.62-77 (1984).
2. S.R. Taylor, G.L. Cahen, Jr., G.E. Stoner, P.J. Moran, M.W. Ferralli, "Ionized Monomer Implantation into Aluminum - A Seawater Immersion Study", in Fundamental Aspects of

Corrosion Protection by Surface Modifications, Vol. 84-3, edited by E. McCafferty, C.R. Clayton, and J. Oudar, The Electrochemical Society, Pennington, NJ, pp.62-77 (1984).

3. S.R. Taylor, G.L. Cahen, Jr., G.E. Stoner, "The Barrier Properties of Thin Carbonaceous Films Formed by Ion Beam Assisted Deposition", in Corrosion Protection by Organic Coatings, Vol.87-2, edited by M.W. Kendig and H. Leidheiser, Jr., The Electrochemical Society, Pennington, NJ, pp.360-376 (1987).
4. R.J. Vora, S.R. Taylor, G.E. Stoner, "Factors Affecting the Performance and Stability of Lead Dioxide Anodes During Hexavalent Chromium Generation", in Performance and Stability of Electrodes for Industrial Electrochemical Processes, Vol. 89-10, edited by F. Hine, B.V. Tilak, J.M. Fenton, J.D. Lisius, The Electrochemical Society, Pennington, NJ, pp.204-214 (1989).
5. S.R. Taylor, "The Adhesion and Barrier Properties of Ion Beam Assisted Carbonaceous Films", in Advances in Corrosion Protection by Organic Coatings, Vol. 89-13, edited by D.L. Scantlebury and M.W. Kendig, The Electrochemical Society, Pennington, NJ, pp. 138-150 (1989) (invited paper).
6. C.F. Kroen, G.E. Stoner, S.R. Taylor, "Application of the Hanging Meniscus Electrode to Oxygen Reduction on Platinum in H_3PO_4, in Proceedings of the 24th Intersociety Energy Conversion Engineering Conference, edited by W.D. Jackson and D.A. Hull, IEEE, pp. 1569-1573 (1989).
7. S.R. Taylor, C.M. Doyle and D.A. Johnson, "The Corrosion Behavior of Cu-Ni, Cu-Cr, and Cr-Ni Galvanic Couples in Polyamic Acid Under Imidizing Conditions", in Corrosion of Electronic Materials and Devices, edited by J.D. Sinclair, The Electrochemical Society, Pennington, NJ, pp. 368-387 (1991).
8. R.L. Cook, Jr. and S.R. Taylor, "An Investigation of Inhibitive Pigments for Aluminum Alloy 2024-T3", in Environmentally Acceptable Inhibitors and Coatings, edited by S.R. Taylor, H.S. Isaacs, E.W. Brooman, The Electrochemical Society, Pennington, NJ, pp.87-102 (1997).
9. M.W. Wittmann and S.R. Taylor, "The Detection and Mapping of Defects in Organic Coatings Using Local Electrochemical Impedance Methods", in Advances in Corrosion Protection by Organic Coatings II, edited by J.D. Scantlebury and M.W. Kendig, The Electrochemical Society, Pennington, NJ, **PV 95-13**:158-168 (1995).
10. J.H. Osborne, K.Y. Blohowiak, S.R. Taylor, C.N. Hunter, G. Bierwagon, B. Carlson, J. Du, D. Bernard, M.E. Donley, "Advanced Corrosion Resistant Coatings for Outer Mold Line Applications", Proceeding from Aging Aircraft Conference, (in press).
11. A.M. Mierisch and S.R. Taylor, "Interpretation of LEI Maps of Coated Substrates", in Localized In-Situ Methods for Investigating Electrochemical Interfaces, Ed. by S.R. Taylor, A.C. Hillier, M. Seo, The Electrochemical Society, **PV 99-28**, pp.229-240 (2000)
12. S.R. Taylor, "Incentives for Using Local Electrochemical Impedance Methods in the Investigation of Organic Coatings", Proceedings 26, 26th International Conference in Organic Coatings, Vouliagmeni, Greece, p.345-356, Institute of Materials Science, New Paltz, NY (2000).
13. R.B. Leggat, E.A. Pehovaz-Diez, N.P. Cella, and S.R. Taylor, "Optimization of Bath Chemistry for Hydrotalcite-Based Conversion Coatings on Aerospace Aluminum

Alloys", in Corrosion and Corrosion Prevention of Low Density Metals and Alloys, Ed. by B.A. Shaw, R.G. Buchheit, and J.P. Moran, The Electrochemical Society, Pennington, NJ, PV 2000-23, pp.124-135 (2001).

14. R.B. Leggat and S.R. Taylor, "Epoxy Adhesion to Hydrotalcite: Correlation Between Contact Angles and Electrokinetic Measurements", in Corrosion and Corrosion Protection, Ed. by J.D. Sinclair, R.P. Frankenthal, E. Kalman, and W. Plieth, The Electrochemical Society, Pennington, NJ, PV 2001-22, pp. 573-578 (2001).
15. S.R. Taylor, J.R. Scully, R.G. Kelly, and G.J. Shiflet, R.G. Buchheit, W.J. van Ooij, K. Sieradzki, C.J. Brinker, and A.L. Moran, "The Development of a Multi-Functional Coating for Aerospace Application Using Molecular and Nano-Engineering Methods: An Overview", in Proceedings of 2002 Tri-Service Conference, Ed. by R.A. Mantz and P.C. Trulove, AFRL, San Antonio, TX (2003).
16. B.D. Chambers, S.R. Taylor, and M.W. Kendig, "The Rapid Discovery of New Inhibitors Using Combinatorial Methods", in Proceedings of 2003 Tri-Service Conference, Ed. by R.A. Mantz and P.C. Trulove, AFRL, San Antonio, TX (2003).
17. R.B. Leggat and S.R. Taylor, "Epoxy Adhesion to Hydrotalcite: Correlation Between Contact Angle and Electrokinetic Measurements", in Proceedings of 2002 Tri-Service Conference, Ed. by R.A. Mantz and P.C. Trulove, AFRL, San Antonio, TX (2003).
18. P. Moongkhamklang and S.R. Taylor, "The Role of Coating Heterogeneities in the Long-Term Performance of Coated Aluminum Alloys: Delineation of Ionic Pathways Using a Molecular Probe", in Proceedings of 2002 Tri-Service Conference, Ed. by R.A. Mantz and P.C. Trulove, AFRL, San Antonio, TX (2003).
19. S.R. Taylor, J.R. Scully, and G.J. Shiflet, R.G. Buchheit, W.J. VanOoij, K. Sieradzki, R.E. Diaz,C.J. Brinker, and A.L. Moran, "The Development of a Multi-functional Aerospace Coating Using Nano-Engineering Methods: A MURI Overview and Progress Report", in Proceedings of 2003 Tri-Service Conference, Ed. by V. Agarwala, NSWC, Las Vegas, NV (2003).
20. P. Moongkhamklang and S.R. Taylor, "Delineation of Ionic Pathways in Organic Coatings Using Molecular Probe Technique and Local Electrochemical Methods", in Proceedings of 2003 Tri-Service Conference, Ed. by V. Agarwala, NSWC, Las Vegas, NV (2003).
21. S.R. Taylor, G.J. Shiflet. J.R. Scully, R.G. Buchheit, W.J. van Ooij, C.J. Brinker, K.S. Sieradzki, R.E., Diaz, and A.L. Moran, "Increasing the Functionality of Military Coatings Using Nano-dimensioned Materials" in Proceeding of First World Congress on Corrosion in the Military: Cost Reduction Strategies, Sorrento, Italy, June 6-8, 2005.
22. S.R. Taylor and B.D. Chambers, "The Discovery of Non-Chromate Corrosion Inhibitors for Aerospace Alloys Using High-Throughput Screening Methods", in Proceeding of First World Congress on Corrosion in the Military: Cost Reduction Strategies, Sorrento, Italy, June 6-8, 2005.
23. B.D. Chambers and S.R. Taylor, "High Throughput Corrosion Assessment of AA2024-T3 in the Presence of Corrosion Inhibitors", in Coatings and Inhibitors, Ed. by M.W. Kendig, G.O. Ilevbare, R. Granata, and S. Kuroda, The Electrochemical Society, Pennington, NJ, (in press).
24. S.R. Taylor, G.J. Shiflet. J.R. Scully, R.G. Buchheit, W.J. van Ooij, C.J. Brinker, K.S.

Sieradzki, R.E., Diaz, and A.L. Moran, "Increasing Coating Functionality Using Nano-dimensioned Materials", Proceedings of Smart Coatings 2007, ACS, Orlando, FL, (2007).

Other Publications

S.R. Taylor, G.J. Picha, and D.F. Gibbons, "The Development of a Surgical Model for the Study of the Percutaneous Interface", Final Report, NASA Contract #NAS-3022443 (1981).

S.R. Taylor and G.J. Picha, "First Annual Report on Percutaneous Connectors", NASA Grant #NAS-3-22654 (1981).

S.R. Taylor, G.L. Cahen, Jr., G.E. Stoner, M.W. Ferralli, P.J. Moran, "Ion Implantation of Ionized Monomer into Aluminum Alloy 6061 for Marine Corrosion Protection", DTNSRDC Center Report - 84/046 (1984).

S.R. Taylor, S.E. Mason, P.A. Cella, G.C. Clemeña, "An Investigation of New Inhibitors to Mitigate Corrosion of Rebar in Concrete", Report No. FHWA/VA-96-R24 (1996).

S.R. Taylor, D.S. Bognaski, G.C. Clemeña, "The Effect of Cathodic Protection on Epoxy Coated Rebar", Report No. FHWA/VTRC 98-R5, (1998).

C.C. Pauly, S.R. Taylor, J.P. Gomez, "The Environmental Durability of Graphite Fiber-Epoxy Matrix Composites", FHWA 2002: http://virginiadot.org/vtrc/main/online_reports/02-r13.htm.

B.D. Chambers, S.R. Taylor, and D.S. Lane, "The Identification and Evaluation of New Inhibitors for Rebar Corrosion in Concrete", VTRC report no. 03-R8, (2003), http://www.virginiadot.org/vtrc/main/online_reports/pdf/03-r8.pdf.

Books/Conference Proceedings Edited

1. Co-editor of ASTM STP 1051, Electrolyte Resistance Measurement and Compensation, Ed. by L.L. Scribner and S.R. Taylor, American Society of Testing and Materials, Philadelphia, (1990).
2. Co-editor of MRS Symposium Proceedings Vol. 411, Electrically Based Microstructural Characterization, Ed. by R.A. Gerhardt, S.R. Taylor, and E.J. Garboczi, The Materials Research Society, Warrendale, PA (1996).
3. Co-editor of Environmentally Acceptable Inhibitors and Coatings, Proceedings Volume 95-16, Ed. by S.R. Taylor, H.S. Isaacs, and E.W. Brooman, The Electrochemical Society, Pennington, NJ (1997).
4. Co-editor of MRS Symposium Proceedings, Electrically Based Microstructural Characterization II, Vol. 500, Ed. by R.A. Gerhardt, M.A. Alim, and S.R. Taylor, The Materials Research Society, Warrendale, PA (1998).
5. Co-editor of Localized In-Situ Methods for Investigating Electrochemical Interfaces, Proceedings Volume 99-28, Ed. by S.R. Taylor, A.C. Hillier, and M. Seo, The Electrochemical Society, Pennington, NJ, (2000).

PRESENTATIONS AND CHAIRED MEETINGS

Chaired Meetings

- Co-chairman of the "Symposium on Ohmic Electrolyte Resistance Measurement and Compensation", Sponsored by ASTM, Baltimore, MD, May 1988.
- Vice-Chairman of the "Corrosion Inhibitors Symposium", 179th Meeting of the Electrochemical Society, Washington, DC, May 1991.
- Chairman of the "Symposium on Corrosion Protection by Coatings and Surface Modification", 183rd meeting of the Electrochemical Society, Honolulu, Hawaii, May 1993.
- Co-Moderator of the "Workshop on Performance Testing of Coatings", 3rd Annual Workshop on Chromate Replacements in Light Metal Finishing, Sandia National Laboratories, September 1993.
- Chairman and Course Organizer of the "Short Course on Electrochemical Impedance Spectroscopy: Theory, Applications, and Laboratory Instructions" 1989-1998.
- Chairman and Organizer of the "Symposium on Environmentally Acceptable Inhibitors and Coatings", Fall Electrochemical Society Meeting, Oct. 1995.
- Co-Chairman and Co-Organizer of the "Symposium on Electrically Based Microstructural Characterization", Materials Research Society, Boston, MA, Nov. 1995.
- Co-Chairman and Co-Organizer of the "Symposium on Electrically Based Microstructural Characterization", Materials Research Society, Boston, MA, Nov. 1997.
- Chair and Organizer of session on "Coatings" in Research in Progress, NACE, San Diego, March 1998.
- Chair of the Coatings session at the Spring Meeting of the Electrochemical Society, San Diego, CA ,May 1998.
- Chair of the Corrosion Protection session at the "Workshop on Advanced Metal Finishing Techniques for Aerospace Applications", Keystone, CO, August 1998.
- Co-Chairman and Co-Organizer of "Symposium on Localized In-Situ Methods for Investigating Electrochemical Interfaces", 198th Meeting of the Electrochemical Society, Fall 1999.
- Chair and Organizer of Research in Progress session on "New Approaches for the Assessment of Corrosion Inhibitors", NACE Meeting, April, 2002.
- Co-Organizer and Co-Chair of "Materials and Surfaces" session in MRSEC Nanotechnology Workshop on Frontiers of Nanostructered Systems, Charlottesville, VA, October 2001.
- Discussion Leader in Coatings Session of the *2002 Gordon Research Conference on Aqueous Corrosion* – Colby-Sawyer College, New London, NH, July 2002
- Chair and Organizer of Research in Progress session on "Smart Coatings", NACE International, Houston, TX, Spring 2005.
- Co-Chair and Co-organizer of Research Topical Symposium on "Smart Coatings: Increasing Function with Advanced Materials", NACE International, San Diego, CA, Spring 2006

Presentations

National Aeronautics and Space Administration Contractors Meeting on Ion Sputtering, Cleveland, Ohio

1980 "The Soft Tissue Response to Ion Textured Polymers"

Reynolds Metals Company, Richmond, Virginia

1982 "The Seawater Immersion Performance of Monomer Implanted Aluminum"
1990 "The Assessment of Organic Coating Performance on Aluminum Using Electrochemical Impedance Spectroscopy" **(invited)**
1992 "The Evaluation of Coated Beverage Can Corrosion by a Novel Electrochemical Technique" (with J.A. Grandle) **(invited)**

The Electrochemical Society

1983 "Ionized Monomer Implantation into Aluminum - A Seawater Immersion Study"
1985 "The Adhesion of Thin Carbonaceous Films Formed by Ion Beam Assisted Deposition"
1986 "The Barrier Properties of Thin Carbonaceous Films Formed by Ion Beam Assisted Deposition"
1989 "Factors Affecting the Performance and Stability of Lead Dioxide Anodes During Hexavalent Chromium Generation", (with R. Vora, G.E. Stoner and G.L. Cahen)
1989 "A Comparison of Electrocatalytic and Microstructural Properties in Platinum and Platinum-Chromium Dispersed Catalysts", (with C.F. Kroen and G.E. Stoner)
1989 "Application of the Hanging Meniscus Rotating Disk Electrode Method to Oxygen Reduction on Platinum in H_3PO_4", (with C.F. Kroen and G.E. Stoner)
1990 "The Corrosion Behavior of Cu-Cr, Cu-Ni, and Cr-Ni Galvanic Couples in Polyamic Acid Under Imidizing Conditions" (with C.M. Doyle, D.A. Johnson, and G.D. Brabson, Jr.)
1990 "In Situ Characterization of Phosphoric Acid Fuel Cells Using Electrochemical Impedance Spectroscopy" (with D.A. Johnson, M. Desai, and V. Jalan)
1990 "Microstructural and Electrocatalytic Properties of Platinum and Platinum-Chromium Dispersed Catalysts" (with C.F. Kroen, G.E. Stoner and G.L. Cahen, Jr.)
1991 "The Characterization of Inhibitor Performance of Emulsogen STH on Mild Steel in Cooling Water Environments" (with S.R. Bolinger)
1991 "Corrosion Inhibition of Mild Steel by Molybdate in Natural Cooling Waters" (with D.G. Kolman)
1991 "The Nondestructive Evaluation of Aluminum Polymer Laminates Using Electrochemical Impedance Spectroscopy" (with G.R.T. Schueller)
1991 "The Detection and Analysis of Electrochemical and Chemical Damage a Graphite/Bismaleimide Composite Using Electrochemical Impedance Spectroscopy" (with F.D. Wall and G.L. Cahen, Jr.)
1992 "The Analysis and Removal of High Frequency Artifacts from EIS Data", (with K.C. Stewart and D.G. Kolman)
1993 "The Evaluation of Organic Coatings on Aluminum Using EIS" (with J.A. Grandle)
1994 "The Detection and Mapping of Coating Defects Using Local Electrochemical Impedance Methods" (with M.W. Wittmann).
1995 "An Investigation of Non-Chromate Inhibitive Pigments for Aluminum Alloy 2024-T3" (with R.L. Cook, Jr.)
1998 "Effects of Resin Chemistry on the Biodegradation of Polyurethane Coating

Performance" (with E.W. Sheridan)
1998 "Characterization of Defects in Coated AA2024-T3 Using Local Chemical and Electrochemical Techniques" (with A.M. Mierisch, J. Yuan, and R.G. Kelly)
1998 "A Local Electrochemical Study of Processing Effects in Coated Aluminum Can Ends" (with R.B. Leggat)
1999 "A New Electrochemical Test Procedure to Quantitatively Screen the Corrosion Performance of Aerospace Coatings" (with C.N. Hunter and J.H. Osborne)
1999 "The Interpretation of LEI Maps on Coated Substrates" (with A.M. Mierisch)
2000 "An Examination of Possible Synergy Between Paired Combinations of Transition and Rare Earth Metal Salts" (**invited**)
2000 " The Corrosion Performance of Field Applied Chromate Conversion Coatings" (with R.B. Leggat)
2000 "Optimization of Bath Chemistry for Hydrotalcite-Based Conversion Coatings of Aerospace Aluminum Alloys" (with R.B. Leggat, E.A. Pehovaz-Diez, N.P. Cella)
2001 "Correlation of Epoxy Adhesion to Hydrotacite with Contact Angle and Electrokinetic Measurements" (with R.B. Leggat)
2002 "High Throughput Methods for the Rapid Discovery of Corrosion Inhibitors", (with B.D. Chambers and M.W. Kendig)
"High Throughput Electrochemical Screening of Inhibitors for Organic Coatings" (with W. Zhang, H. Guan, R. Buchheit, M.W. Kendig, and L.L. Scribner)
2003 "The Delineation of Ionic Pathways in Polymer Films Using Molecular Probes" (with P. Moonkhamklang)
"The Effect of Coordination Compounds within Epoxy Coatings on the Corrosion of AA 2024-T6", (with F. Contu)
"The Healing Characteristics of Non-Chromate Corrosion Inhibitors when Incorporated into Silane Films on AA2024-T3" (with L. Fenzy and F. Contu)
"The Rapid Identification of Synergistic Inhibitor Combinations for AA2024-T3 Using Combinatorial Methods" (with B.D. Chambers)
2005 "High Throughput Corrosion Assessment of AA2024-T3 in the Presence of Corrosion Inhibitors (with B.D. Chambers)

National Association of Corrosion Engineers (NACE)
1989 "Electrochemical Sensors to Monitor the Corrosion of Reinforcing Steel in Concrete", (with S.A. White and G.E. Stoner)
1990 "Reference Electrode Considerations in Electrochemical Measurements" (**invited**)
1991 "Problems Associated with Impedance Measurements in Low Conductivity Environments" (**invited**)
1991 "The Decision Process in the Interpretation of Impedance Data"
1992 "The Detection of Electrochemically Derived Damage in Bismaleimide/ Graphite Fiber Composites" (**invited**)
1993 "The Influence of Sulfate Reducing Bacteria on Weldments of Alloy 625 Clad Pipe" (with D.G. Enos)
1995 "The Effects of Sulfate Reducing Bacteria on Stainless Steel and Ni-Cr-Mo Alloy Weldments" (with T.A. Petersen)

1995 "The Detection and Analysis of Electrochemical Damage in Bismaleimide-Graphite Fiber Composites" (**invited** – Research in Progress)

1995 "An Investigation of Inhibitive Pigments for Aluminum Alloy 2024-T3" (with R.L. Cook, Jr.)

1997 "The Role of Coating and Substrate Heterogeneities in the Long-Term Performance of Painted Aluminum Alloys" (**invited** – Research in Progress)

1998 "The Role of Coating and Substrate Heterogeneities in the Long-Term Performance of Painted Aluminum Alloys" (Research in Progress)

2002 "The Development of a Multi-Functional Aerospace Alloy Using Nano-Engineering Methods" (Research in Progress with J.R. Scully, R.G. Kelly, G.J. Shiflet, R.G. Buchheit, W.J. VanOoij, C.J. Brinker, K. Sieradzki, and A.L. Moran, **invited**))

"The Rapid Discovery of Corrosion Inhibitors Using Combinatorial Methods" (Research in Progress with B.D. Chamber and M.W. Kendig)

2005 "The On-Demand Delivery of Corrosion Inhibitors from Organic Coatings Using Coordination Compounds" (Research in Progress with F. Contu)

2006 "Multiple Electrode Methods to Massively Parallel Test Corrosion Inhibitors for AA2024-T3) (with B.D. Chambers)

"High Throughput Screening Methods for the Discovery of Non-chromate Corrosion Inhibitors" (with B.D. Chambers and F. Contu) (in Research Topical Symposium)(**invited**)

Alcoa Technical Center, Alcoa Center, PA

1984 "Ion Beam Assisted Deposition of Thin Carbonaceous Films" (**invited**)

Naval Research Laboratories, Washington, D.C.

1985 "The Adhesion Properties of Thin Carbonaceous Films Formed by Ion Beam Assisted Deposition" (**invited**)

1998 "The Role of Backbone Chemistry in the Microbial Influenced Degradation of Polyurethane Coatings" (**invited** with E.W. Sheridan)

International Symposium on Advances in Corrosion Protection by Organic Coatings, Cambridge, UK

1989 "The Adhesion and Barrier Properties of Ion Beam Assisted Carbonaceous Films" (**invited**)

1994 "The Detection and Mapping of Coating Defects Using Local Electrochemical Impedance Methods"

1999 "Characterization of the Electrochemical Events at Intrinsic Breakdown Sites on Organically Coated AA2024-T3" (with A.M. Mierisch – **invited**)

2004 "The Delineation of Ionic Pathways in Organic Coatings Using Molecular Probes"

First World Congress on Corrosion in the Military: Cost Reduction Strategies, Sorrento, Italy

2005 "Increasing the Functionality of Military Coatings Using Nano-dimensioned Materials" (with G.J. Shiflet. J.R. Scully, R.G. Buchheit, W.J. van Ooij, C.J.

Brinker, K.S. Sieradzki, R.E., Diaz, A.L. Moran)
2005 "The Discovery of Non-Chromate Corrosion Inhibitors for Aerospace Alloys Using High-Throughput Screening Methods" (with B.D. Chambers)

Aluminum Company of Canada (Alcan), Kingston, Ontario
1989 "Electrochemical Approaches to the Nondestructive Evaluation of Graphite Fiber/Polymer Matrix Composites" **(invited)**

NASA Langley Research Center, Hampton, VA
1987 "The Nondestructive Evaluation of Graphite Fiber/Epoxy Composites Using Electrochemical Impedance Spectroscopy"
1991 "The Detection and Analysis of Electrochemical and Chemical Damage to a Graphite/Bismaleimide Composite Using Electrochemical Impedance Spectroscopy" (with F.D. Wall and G.L. Cahen, Jr.)
1993 "The Detection and Analysis of Electrochemical and Chemical Degradation in BMI/Graphite Fiber Composites Using EIS" (with F.D. Wall, K.C. Stewart, and G.L. Cahen, Jr.)

Naval Air Development Center, Warminster, PA
1990 "The Simulation and Detection of Electrochemically Derived Damage in BMI/Graphite Fiber Composites", (with D.F. Wall and G.L. Cahen, Jr.) **(invited)**

Wright Patterson AFB Research Laboratories, Wright Patterson AFB, OH
1991 "The Simulation and Detection of Electrochemical and Chemical Damage to a Graphite/Bismaleimide Composite Using Electrochemical Impedance Spectroscopy" (with F.D. Wall and G.L. Cahen, Jr.)**(invited)**

Rockwell International Science Center, Thousand Oaks, CA
1991 "Electrochemical Approaches to the Nondestructive Evaluation of Graphite Fiber/Polymer Matrix Composites" **(invited)**

Digital Equipment Corporation, Andover, MA
1991 "Bimetallic Couples in Polyamic Acid Under Imidizing Conditions"

ARCO, Dallas, TX
1991 "Characterization of Inhibitor Performance Using EIS" **(invited)**

Mobil Oil Research Laboratories, Dallas, TX
1991 "Characterization of Inhibitor Performance Using EIS" **(invited)**

AMP, Inc., Harrisburg, PA
1989 "The Theory of Impedance as Applied to Electrochemical Systems"

(invited)

1989 "The Application of Electrochemical Impedance Spectroscopy to the Analysis of Organic Coatings" **(invited)**

Union Camp Corporation, Franklin, VA

1990 "The Recovery and Analysis of Recovery Boiler Tube Deposits"

Tennessee Eastman Corporation, Kingsport, TN

1990 "The Characterization of Corrosion Behavior in Acetic Acid/Acetic Anhydride Using EIS"

Ball Corporation, Muncie, IN/Denver, CO

1993 "The Quantification of Coating Performance Using Electrochemical Methods" **(2 invited lectures)**

1997 "The Role of Coating and Substrate Heterogeneities in the Long-Term Performance of Painted Aluminum Alloys" **(invited** with R.B. Leggat)

American Society for Metals - Aeromat, Long Beach, CA

1991 "The Simulation and Detection of Electrochemically Derived Damage in BMI/Graphite Fiber Composites" (with F.D. Wall and G.L. Cahen, Jr.)

American Society for Testing and Materials

1991 "The Simulation and Detection of Electrochemical Damage in BMI/Graphite Fiber Composites Using Electrochemical Impedance Spectroscopy" (with F.D. Wall and G.L. Cahen, Jr.)

1991 "Equivalent Circuit Modeling of Aluminum/Polymer Laminates Using Electrochemical Impedance Spectroscopy" (with G.R.T. Schueller)

1991 "The Effect of Parasitic Conduction Pathways on EIS Measurements in Low Conductivity Media" (with K.C. Stewart and D.G. Kolman)

1994 "The Effect of Cathodic Protection on Embedded Epoxy Coated Rebar" (with D.S. Bognaski and G.C. Clemena)

1997 "The Detection of Steel Corrosion in Concrete with a New Electrically Based Technique" (with P.A. Cella)

1998 "Electrochemical Approaches to the Assessment of Inhibitors" **(invited)**

Tel Aviv University, Ramat-Aviv, Tel-Aviv, Israel

1991 "The Theory of Impedance Spectroscopy and Its Application to Electro-chemical Energy Conversion Devices" **(15 hours of invited lectures)**

Materials Research Society, Boston, MA

1995 "The Detection and Mapping of Coating Defects Using Local Electrochemical Impedance Methods (with M.W. Wittmann)

1997 "Understanding Coating an Substrate Heterogeneities Using Local

Electrochemical Impedance Methods" (with A.M. Mierisch)
2001 "Incentives for Using LEIM in the Investigation of Organically Coated Alloys" **(invited)**

Second International Symposium on Electrochemical Impedance Spectroscopy, Santa Barbara, CA
1992 "The Effect of Surface Inhomogeneities on the Electrochemical Impedance Response of Aluminum" (with G.R.T. Schueller)
1992 "The Detection of Chemical and Electrochemical Damage in BMI/Graphite Fiber Composites Using EIS" (with F.D. Wall and G.L. Cahen, Jr.)
1992 "The Origins of High Frequency Artifacts in Electrochemical Impedance Spectra" (with K.C. Stewart and D.G. Kolman).

Fourth International Symposium on Electrochemical Impedance Spectroscopy, Angra dos Reis, Brazil
1998 "Understanding Coating an Substrate Heterogeneities Using Local Electrochemical and Chemical Methods" (with A.M. Mierisch, J. Yuan, and R.G. Kelly)

American Academy of Facial and Reconstructive Surgery, New Orleans, LA
1999 "Biomechanical Properties of Autogenous Tissue Engineered Cartilage" (with A.S. Lee, S.S. Park, and J.C. Iezzoni)

NATO Advisory Group for Aerospace Research and Development, Seville, Spain
1994 "The Detection and Analysis of Galvanic Damage in BMI/Graphite Fiber Composites" (with G.L. Cahen, Jr.) **(invited)**

ONR Workshop on Organic Coatings, Annapolis, MD
1994 "The Use of Electrochemical Noise in the Assessment of Coating Performance on Aluminum"
1994 "The Assessment of Coating Performance of Organic Coatings on Aluminum Using Electrochemical Impedance Spectroscopy"
1995 "The Use AC Methods in the Analysis and Assessment of Coating Performance" **(invited)**
1999 "A New Electrochemical Test Procedure to Quantitatively Screen the Corrosion Performance of Aerospace Coatings) **(invited**, with C.N. Hunter, J.H. Osborne)

AFOSR/DARPA Coating Conference
1996 "Environmentally Compliant Corrosion Resistant and Electrically Conductive Inorganic Coatings" (with R.G. Buchheit) **(invited)**
1996 "The Role of Coating and Substrate Heterogeneities in the Long-Term Performance of Painted Aluminum Alloys" **(invited)**
1997 "Environmentally Compliant Corrosion Resistant and Electrically Conductive

Inorganic Coatings" (**invited** with R.G. Buchheit)
1997 "The Role of Coating and Substrate Heterogeneities in the Long-Term Performance of Painted Aluminum Alloys" (**invited**)
1998 "Environmentally Compliant Corrosion Resistant and Electrically Conductive Inorganic Coatings" (**invited** with R.G. Buchheit)
1998 "The Role of Coating and Substrate Heterogeneities in the Long-Term Performance of Painted Aluminum Alloys" (**invited**)
2000 "Environmentally Compliant Corrosion Resistant and Electrically Conductive Inorganic Coatings" (with R.G. Buchheit) (**invited**)
2000 "The Role of Coating and Substrate Heterogeneities in the Long-Term Performance of Painted Aluminum Alloys" (**invited**)

3M Austin Center, Austin, TX
1995 "The Use AC Methods in the Analysis and Assessment of Coating Performance" (**invited**)
2000 "Incentives for Using Local Electrochemical Impedance Methods in the Investigation of Organic Coatings" (**invited**)
2001 "The Development of an Environmentally Compliant, Multi-Functional Aerospace Coating Using Molecular- and Nano-Engineering Methods" (**invited**)
2005 "The Discovery of Non-chromate Corrosion Inhibitors fro Aerospace Alloys Using High-Throughput Screening Methods" (**invited**)

The Boeing Company, Renton, WA
2005 "Development of Multi-functional Coatings Using Nano-dimensioned Materials"

Workshop on Adv. Metal Finishing Techniques for Aerospace Appl., Keystone, CO
1998 "Non-Electrolytic Formation of Aluminum Oxide Surface Layers by Reversion of Hydrotalcite" (with R.G. Buchheit) (**invited**).

Workshop on Nanotechnology in Coatings, Keystone, CO
2002 "The Development of a Multi-Functional Aerospace Coating: Considerations in the Use of Nano-Dimensioned Materials, (with K. Sieradzki)

Workshop on Multifunctional Materials, Keystone, CO
2005 "Increasing the Functionality of Military Coatings Using Nano-dimensioned Materials", S.R. Taylor, G.J. Shiflet. J.R. Scully, R.G. Buchheit, W.J. van Ooij, C.J. Brinker, K.S. Sieradzki, R.E., Diaz, A.L. Moran

Transportation Research Board Meeting, Washington, DC
1998 "Issues Associated with the Corrosion Performance of Coatings on Rebar" (**invited**)
1999 "A New Approach to the Assessment of Corrosion Inhibitors in Concrete" (**invited**)

The Gordon Research Conference on Physics and Chemistry of Coatings and Films, New London, NH

1997 "The Role of Heterogeneities in the Determination of Coating Performance" **(invited)**

2005 "The Use of Nano-dimensioned Materials for the Production of Advanced Coatings - Separating Fact and Fiction" **(invited)**

North Carolina State University, Raleigh, NC

1995 "The Nondestructive Detection and Analysis of Damage in Bismaleimide-Graphite Fiber Composites Using Electrochemical Techniques" **(invited)**

Swedish Corrosion Institute, Stockholm, Sweden

1998 "Application of Electrochemical Impedance Spectroscopy to the Understanding of Materials Durability" **(invited)**

2003 "The Development of a Multi-functional Aerospace Coating Using Nano-Engineering Methods: A MURI Overview", **(invited)**

AFRL 1999 Technology Workshop on Long-Lived Aerospace Primers, Dayton, OH

1999 "A New Electrochemical Test Procedure to Quantitatively Screen the Corrosion Performance of Aerospace Coatings) (with C.N. Hunter, J.H. Osborne)

26th Annual International Conference on Organic Coatings, Athens, Greece

2000 "Incentives for Using Local Electrochemical Impedance Methods in the Investigation of Organic Coatings" **(invited)**

6th Biennial Conf. on the Sci. and Technol. of Organic Coatings, Hilton Head, SC

2000 "Incentives for Using Local Electrochemical Impedance Methods in the Investigation of Organic Coatings" **(invited)**

SERDP/ESTCP Partners in Environmental Technology Workshop, Wash., DC

2001 "The Development of an Environmentally Compliant Multi-Functional Aerospace Coating" **(invited – keynote lecture)**

Tri-Service Corrosion Conference

2002 "The Rapid Discovery of New Inhibitors Using Combinatorial Methods" (with B.D. Chambers and M.W. Kendig)(San Antonio, TX)

"The Role of Coating Heterogeneities i the Long-Term Performance of Coated Aluminum Alloys: Delineation of the Mode of Ion Entry" (San Antonio, TX)

"The Development of a Multi-Functional Aerospace Coating Using Nano-Engineering Methods" (San Antonio, TX)

2003 "The Development of a Multi-functional Aerospace Coating Using Nano-Engineering Methods: A MURI Overview" (Las Vegas, NV)

"Delineation of Ionic Pathways in Organic Coatings Using Molecular Probe Technique and Local Electrochemical Methods" (Las Vegas, NV)

2005 "The Development of a Multi-functional Aerospace Coating Using Nano-Dimensioned Materials: A MURI Overview" (Orlando, FL)

"New Methods for the Discovery and Delivery of Non-chromate Corrosion Inhibitors" (Orlando, FL)

North Carolina State University, Dept. of Materials Science and Engr., Raleigh, NC

1991 "The Use of Electrochemical Methods to Non-destructively Evaluate Composite Damage" **(invited)**

SUNY Stony Brook, Dept. of Materials Science and Engineering, Stony Brook, NY

2003 "The Role of Coating Heterogeneities in the Long-Term Performance of Coated Aluminum Alloys: Delineation of the Mode of Ion Entry" **(invited)**

Clemson University, Department of Polymers Science, Clemson, SC

2003 "The Long-term Sustainability of an Engineering Research Center" **(invited)**

North Dakota State University, Dept. of Polymers and Coatings, Fargo, ND

2003 "The Role of Coating Heterogeneities i the Long-Term Performance of Coated Aluminum Alloys: Delineation of the Mode of Ion Entry" **(invited)**

2006 "The Discovery of Non-Chromate Corrosion Inhibitors for Aerospace Alloys Using High-Throughput Screening Methods" **(invited)**

University of Dayton Research Institute, Dayton, OH

2004 "The Role of Coating Heterogeneities i the Long-Term Performance of Coated Aluminum Alloys: Delineation of the Mode of Ion Entry" **(invited)**

University of Southern Mississippi, Dept. of Polymers Science and High Performance Materials, Hattiesburg, MS

2004 "The Use of Nano-dimensioned Materials and the Localized Electrochemical Methods in the Development of New Generation Coatings" **(invited)**

2005 "The Discovery of Non-Chromate Corrosion Inhibitors for Aerospace Alloys Using High-Throughput Screening Methods" **(invited)**

2006 "The Environmental Durability of Composites" **(invited)**

NanoTechnology Initiative, Charlottesville, VA

2003 "The Development of an Environmentally Compliant, Multi-Functional Aerospace Coating Using Molecular- and Nano-Engineering Methods" **(invited)**

Institute for Defense and Government Advancement, Nanotechnology for Defense, Georgetown Conference Center, Washington, DC

2005Multi-functional Nanocomposite Materials and Coatings", W.E. Benson and S.R. Taylor, 3 hour workshop **(invited)**

2005The Development of Multi-funcional Coatings Using Nano-dimensioned

Materials", S.R. Taylor and W.E. Benson, 3 hour workshop **(invited)**

PPG Inc., Allison Park, PA

2006 "*The Hunt for Chromate Replacements:* Discovery of Promising Inhibitor Synergies Using High-Throughput Screening Methods", S.R. Taylor, B.D. Chambers, F. Contu **(invited)**

4th International Symposium on Aluminum Surface Science and Technology, Beaune, France

2006 "The Discovery of Non-Chromate Corrosion Inhibitors for Aerospace Alloys Using High-Throughput Screening Methods" (with B.D. Chambers)

"Increasing the Functionality of Coatings Using Nano-dimensioned Materials", (poster with G.J. Shiflet, J.R. Scully, R.G. Buchheit, W.J. Van Ooij, C.J. Brinker, K. Sieradzki, R.E. Diaz, and A.L. Moran).

Aging Aircraft Technical Interchange Meeting, Oklahoma City Air Logistics Center, Tinker AFB, OK

2005 "Research, Development, and Assessment of Environmentally Compliant Coatings and Inhibitors for the Protection of Military Assets" (poster)

"The Development of a Multi-Functional Aerospace Coating Using Nano-Engineered Materials" (poster) (with G.J. Shiflet, J.R. Scully, R.G. Buchheit, W.J. Van Ooij, C.J. Brinker, K. Sieradzki, R.E. Diaz, A.L. Moran).

American Chemical Society, San Francisco, CA

2006"Increasing Coating Functionality Using Nano-dimensioned Materials" (with G.J. Shiflet, J.R. Scully, R.G. Buchheit, W.J. VanOoij, K. Sieradzki, R.E. Diaz, C.J. Brinker, and A.L. Moran) **(invited)**

Smart Coatings 2007, Orlando, FL

2007 "Increasing Coating Functionality Using Nano-dimensioned Materials" (with G.J. Shiflet, J.R. Scully, R.G. Buchheit, W.J. VanOoij, K. Sieradzki, R.E. Diaz, C.J. Brinker, and A.L. Moran) **(invited)**.

French Corrosion Institute (Institut de la Corrosion), Brest, France

2007 "Biomedical Materials: Issues and Opportunities" **(invited)**

"The Discovery of Non-chromate Corrosion Inhibitors Using HTS Methods" **(invited)**

"Increasing Coating Functionality Using Nano-dimensioned Materials" (with G.J. Shiflet, J.R. Scully, R.G. Buchheit, W.J. VanOoij, K. Sieradzki, R.E. Diaz, C.J. Brinker, and A.L. Moran) **(invited)**.

PROPOSALS AND RESEARCH FUNDING – S.R. Taylor, PI

Digital Equipment Corporation, Andover, MA

An Investigation of the Corrosion Phenomenon Associated with Bimetallic Couples in Polyimide Solutions
status: funded July 1988 to July 1989 (**$25,876**)

Aluminum Company of Canada (Alcan), Kingston, Ontario
The Nondestructive Evaluation of Aluminum/Polymer Laminates Using Electrochemical Methods
status: funded May 1988 to May 1991 (**$51,000**)

Virginia Power, Richmond, VA
In-Situ Electrochemical Corrosion Measurements of Service Water and Bearing Cooling Systems
status: funded August 1989 to September 1995 (**$320,000**)

Tennessee Eastman Company, Kingsport, TN
The Characterization of 316L and Hastelloy C276 in Acetic Anhydride Using Electrochemical Impedance Spectroscopy
status: funded June 1989 to December 1990 (**$33,610**)

Reynolds Metals Company, Richmond, VA
The Assessment of Aluminum Can Linings Using Electrochemical Methods
status: funded June 1990 to December 1992 (**$45,000**)

Ball Corporation, Muncie, IN
The Quantification of Aluminum Can Coating Performance Using Impedance Spectroscopy and Noise Analysis
status: funded January 1991 to December 1993 (**$60,000**)

Siemens Automotive, Newport News, Virginia
The Corrosion Characteristics of Stainless Steel Alloys in Methanol Containing Fuel Mixtures
status: funded January 1992 to June 1992 (**$15,000**)

Naval Air Warfare Center, Warminster, PA
The Detection and Analysis of Electrochemical Degradation in High Temperature Polymer Matrix Composites
status: funded July 1992 to December 1992 (**$25,000**)

Virginia Department of Transportation, Richmond, VA
Cathodic Polarization of Epoxy-Coated Rebar in Concrete
status: funded November 1992 to December 1994 (**$158,580** total - unburdened)

National Cooperative Highway Research Program, Washington,DC
Procedures for Evaluating Corrosion-Inhibiting Admixtures for Structural Concrete
status: approved (June 1995 to December 1997 (**$275,000**)
contract could not be signed by U.Va. (Virginia state institution or agency) due due to infinite indemnification clause imposed by NCHRP

Office of Naval Research, Arlington, VA
The Role of Resin Chemistry and Additive Interactions in the Biodegradation of Polyurethane Coatings
status: supported through UVa/NRL co-op.

Boeing Corporation, Seattle, WA

An Investigation of Inhibitive Pigments for Aluminum Alloys 7075 and 2024
status: funded September 1991 to December 1993 (**$120,000**)
Advanced Erosion-Corrosion Resistant Coatings for Aluminum Alloys
status: funded December 1996 to December 1999 (**$198,000**)

Air Force Office of Scientific Research, Washington, DC
The Role of Coating and Substrate Heterogeneities in the Long-Term Performance of Coated Aluminum Alloys (PI-S.R. Taylor, J.R. Scully and R.G. Kelly, investigators)
status: funded May 1996 to Jan. 2002 (**$1,359,614**)
renewal submitted for Jan. 2002 to Oct. 2005 (**$451,000 total, $90,000** to SRT)(start 6/01/02)

Defense Advanced Research Projects Agency, Arlington, VA
Environmentally Compliant Corrosion Resistant and Electrically Conductive Inorganic Coatings
status: funded June 1996 to June 2000 (**$1,408,000** total, **$475,000** to SRT))

Can Research Consortium (American National Can/Pechiney, Ball Corp., Metal Container Corp./Anheuser-Busch, Reynolds Metals, Valspar Corp.)
The Role of Coating Heterogeneities and Food Chemistry in the Long-Term Performance of Aluminum Cans
status: funded Sept. 1995 to Sept. 1998 **($150,000)**

AFOSR/Department of Defense - Multi-University Research Initiative, Washington, DC
The Development of an Environmentally Compliant, Multi-Functional Aerospace Coating Using Molecular and Nano-Engineering Methods (PI-S.R. Taylor)
Status: funded May 2001 to August 2006 (**$5M** total (**$2.75M** to UVa, **$1.15M** to SRT))

State of Virginia, Commonwealth Trust Research Fund, Richmond, VA
The Development of an Environmentally Compliant, Multi-Functional Aerospace Coating Using Molecular and Nano-Engineering Methods (PI-S.R. Taylor)
Status: funded July 2001 to July 2004 (**$728,000** in matching funds)

Virginia Transportation Research Council, Charlottesville, VA
The Use of Appliques for the Rehabilitation of Lead-based Painted Bridges
Status: funded July 2001 to June 2004 (**$210,000** total - unburdened)

Defense University Research Instrumentation Program, Washington, DC
Instrumentation for the Rapid Discovery and Mechanistic Understanding of Non-Chromate Inhibitors
Status: funded in May 2003 to May 2004 (**$167,990**).

Defense University Research Instrumentation Program, Washington, DC
Instrumentation to Identify and Characterize Chemical Heterogeneities with Organic Coatings"
Status: not funded ($163,450).

Subcontract to University of Virginia for AFOSR/DoD MURI on Multi-Functional Aerospace Coatings
Status: funded January 2004 to August 2006 (**$848,850**)

National Institute for Dental and Craniofacial Research (NIDCR), Washington, DC
Validation of *In Vitro* Enamel Demineralization by FTIR and Impedance Spectroscopy
Status: not funded, N. Wood PI, (2 years, **$370K** total (**$200K** to SRT)) to be resubmitted

NASA Technology Transfer Office, Kennedy Space Center, Cape Canaveral, Florida
Smart Coating Systems for Aerospace Applications (PI-S.R. Taylor, L.M. Calle, and D.C. Webster
Status: funded (1 year, **$295K** total, **$75K** to SRT)

National Institute for Dental and Craniofacial Research (NIDCR), Washington, DC
A Novel Glass-ionomer Composite Using Sol Gel-derived Coatings and Nano-particles (PI-S.R. Taylor, Co-investig.-A.D. Puckett, B.J. Chisholm, A.D. McMillan, B.S. Rubel)
Status: not funded (3 years, **$820,630** total, **$157K** to SRT)

Strategic Environmental Research and Development Program, Washington, DC
Mechanism of Corrosion Protection of Metals by Chromate Replacements (P.I.-W.J. van Ooij (Univ. Of Cincinatti), Co-P.I.-S.R. Taylor)
Status: in review (4 years, **$2.4M** total, **$577K** to SRT)

Strategic Environmental Research and Development Program, Washington, DC
The Mechanisms, Synergies and Predictive Models for Non-chromate Corrosion Inhibitors (PI – S.R. Taylor, Co-Investigators – C.R. Clayton, G.P. Halada, H.S. Isaacs, M.W. Kendig, C.A. Johnson, J.D. Demaree, R.P.I. Adler, E.W. Lipnickas)
Status: in review (4 years, **$2.19M** total, **$692K** to SRT)

U.S. PATENTS

1. "In-Situ Sensor for Critical Corrosion Conditions in a Material Concrete", U.S. Patent 5,895,843 (1999) S.R. Taylor and P.A. Cella.
2. "Chromate-Free Protective Coatings", U.S. Patent 5,866,652 (1999) H.E. Hagar, J.J. Johnson, K.Y. Blohoviak, C.M. Wong, J.H. Jones, S.R. Taylor, R.L. Cook.
3. "Chromate-Free Protective Coatings", U.S. Patent 6,077,885 (2001) H.E. Hagar, J.J. Johnson, K.Y. Blohoviak, C.M. Wong, J.H. Jones, S.R. Taylor, R.L. Cook.
4. "Lithium Nitrate Corrosion Inhibitor for Concrete" D.S. Lane, B.D. Chambers, and S.R. Taylor, U.S. Patent Application No. 10/533,994 (May 5, 2005).
5. "Novel Synergistic Combinations of Chromate-free Corrosion Inhibitors and Methods for Discovery Using High Throughput Screening", S.R. Taylor and B.D. Chambers, Provisional Patent Application No. 60/657,298.(March 2005).
6. "Synergistic Combinations of Chromate-free Corrosion Inhibiors", S.R. Taylor and B.D. Chambers, PCT Application (March 2006).

TEACHING

Teaching Assistant

ENGR 209	Materials Science for Engineers, Fall 1983
MS 102	Introduction to the Science of Engineering Materials, Spring1984
MS 301	Corrosion and Its Prevention, Fall 1985
MS 608	Applied Electrochemistry, Spring 1985

Lectures

MSE 102	Spring 1984
MSE 301	Fall 1985, 1988, 1990

MSE 608	Spring 1985-2000
MSE 201	Spring 1988-89, 1997 Fall 1987-89, 1996-2001
MSE 791	Interfacial Electrochemistry: Fall 1989
BIOM 891	Biomaterials (MS 431): Fall 1992
CHEM 743	Biological Chemistry: Spring 2001
MS 619	Materials Science: Spring 2004-06 (School of Dentistry, UMMC)

Courses Taught

MSE 102/209	Introduction to the Science of Engineering Materials Spring 1989-1991, 1993-2002
MSE 512	Introduction to Biomaterials: Spring 1997-2002

Short Courses

"The Theory and Application of Electrochemical Impedance Spectroscopy to the Investigation of Corrosion Phenomena"
a 1 week course taught each year from 1989-2006

"The Theory of Impedance Spectroscopy and Its Application to Electrochemical Energy Conversion Devices"
Tel Aviv University, Ramat-Aviv, Tel-Aviv, Israel, December 1991

GRADUATE STUDENT ACTIVITY (Univ. of Virginia)

Ph.D. Comprehensive Exam Committee for:

D.L. Reichert	T.D. Bayha	H. Chen
C.C. Jones	W.C. Porr, Jr.	J.M. Kunze
C.F. Kroen	G.R.T. Schueller	J.M. Warren
M.F. Bartholomeusz	Y. Yang	F. Smith
S. Hayes	D. Longo	R.B. Leggat
D. Pile	S.S. Sharp	D.A. Little

Thesis Committees:

R.C. Glass (MS)	J.P. Moran (PhD)	R.B. Leggat[III] (MS)
D.L. Reichert (MS,PhD)	L.L. Melvin (MS)	C.A. Pauly (MS)
B.A. Carney (MS)	T.P. Mangiacapre (MS)	R.J. Vora (MS)
S.R. Bolinger (MS)	S.A. White (MS)	R.G. Buchheit (PhD)
F.N. Smolko (MS,ChE)	E.B. Bonham (PhD,ChE)	C.F. Kroen (PhD)
M.A. Jaworski (MMS)	G.R.T. Schueller (PhD)	D.G. Kolman (MS)
S.D. Huetner (MS,NE)	F.D. Wall (MS)	K.C. Stewart (MS)
J.A. Grandle (MS)	D.G. Enos (MS)	R.L. Cook, Jr. (MS)
M.W. Wittmann (MS)	T.A. Petersen (MS)	D.S. Bognaski (MS)
S. Brossia (PhD)	L.A. Pawlick (MS)	S.Y Yu (PhD)
C.N. Hunter (MS)	A.M. Miersich (PhD)	R.B. Leggat (PhD)
D. Pile (PhD-ChE)	B.D. Chamber (MS)	K.A. Ferrer (Ph.D.)
F. Zou (***PhD - KTH – Sweden – selected as opponent***)		M. Hurley (MS)

Students Graduated:

Masters of Science – Materials Science and Engineering – University of Virginia

S.R. Bolinger	D.G. Kolman	R.B. Leggat[III]
J.A. Grandle**	C.C. Pauly	K.C. Stewart**
D.G. Enos	M.W. Wittmann	R.L. Cook, Jr.
T.A. Petersen	P.A. Cella	S. Boussa (ME)
D.S. Bognaski (ME)	C.N. Hunter	B.D. Chambers
L. Fenzy		

** - NSF Fellow

Ph.D. – Materials Science and Engineering – University of Virginia

G.R.T. Schueller	A.M. Miersich (Physics)	R.B. Leggat[III]
B.D. Chambers		

Undergraduate Thesis Advisees:

K.J. Knueppel*	J.R. Daugherty*	J. Kittredge
K.M. Aiello	S.W. Stoner	C.M. Doyle*#
J.A. Grandle	D.R. Peterson	R.L. Cook
S.F. Mason	A.G. Crosby*	B.D. Chambers
E.A. Pehovaz-Diez*	M.L. Gehl	K.M. Iwasaki
P. Coleburn	C. Standridge	

* - winner of undergraduate thesis competition # - winner of Sigma Xi Anniversary Award

Past Post-Doctoral Students

S. Raman (hired from Rutgers Univ.)

Current Post-Doctoral Students

F. Contu (hired from Swiss Federal Inst.)

Current Graduate Students: B.D. Chambers (PhD., from University of Virginia)

RESEARCH EQUIPMENT ACQUIRED - TRANSFERABLE

3 Solartron Frequency Response Analyzers (1252, 1255, 1260)	$72,000
3 Solartron Electrochemical Interfaces (1286, (2)1287)	$51,000
Hewlett Packard 4194A Gain-Phase Analyzer	$38,000
Local EIS Mapping Unit	$75,000
EG&G PAR Kelvin Probe and Scanning Vibrating Electrode (left at Univ. of Virginia, not transferred)	$76,000
Kruss K-12 Tensiometer	$25,000
Bio-Rad/Varian FTIR Microscope and 32x32 Focal Plane Array	$235,000

Varian Raman Spectrometer	$75,000
Q-Fog Salt Spray Cabinet	$17,000
(left at Univ. of Virginia, not transferred)	
SI Photonics UV-Vis Spectrophotometer and reflectance probe	$ 8,000
Microscope, digital camera	$ 8,000
Scribner Assoc. Multiple Micro-electrode Analyzer	$33,000
Electrochemical Quartz Crystal Microbalance	$14,000
Molecular Devices Plate Reader	$35,000
Dell PWS650 Work Station (dual Xeon 2.8 GHz CPU, 3.5 GB RAM)	$7,500
Accelrys MS Modeling Software	$25,000
Computers (some not transferable)	$25,000

SERVICE

2002-2003	University Committee on Nano-materials	Univ. of Virginia
2003-present	Dean's Research Advisory Committee	Dental School-UMMC
2003-present	Graduate Council of UMMC	UMMC
2005-present	UMMC Research Advisory Council	UMMC

REFERENCES

Academic

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Other references available upon request